

REMARKS

This Response is responsive to the Final Office Action mailed June 10, 2009. At the time of that Action, claims 1-15, 17-23, and 25-26 were pending, claims 16 and 24 having been withdrawn. In this Response, no claims have been amended. Reconsideration and full allowance are respectfully requested.

In the Final Office Action, the Examiner rejected claims 1, 3, 5-15, 17, and 23 under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Pub. No. 2002/0136031 (hereinafter "Yamaguchi"). The Examiner also rejected claims 25-27 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,712,160 (hereinafter "Sato"). The Examiner also rejected claims 19-22 under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi in view of U.S. Pat. No. 6,225,560 (hereinafter "Machado"). The Examiner also indicated that claims 2, 4, and 18 are objected to as being dependent upon a rejected base claim, but would otherwise be allowable if rewritten in independent form.

As described in the Specification of the present application, embodiments of the present invention address the need for power supply circuits and fabrication methods that allow for reduced size and enhanced power density. To achieve this, the embodiments of the present invention disclose different ways to physically orient a primary side circuit carrier of a power supply circuit with respect to a secondary side circuit carrier. As can be appreciated, the orientation provided by the various embodiments improves the power density, such that the power supply circuits may be desirable for applications that include size and form factor restrictions. Additionally, the orientation of the primary side circuit carrier with respect to the secondary side circuit carrier may also provide improved air and creepage distances between the primary side circuit and the secondary side circuit of a power supply.

Claim 1 is directed to a power supply circuit that includes at least one transformer that includes a primary winding and a secondary winding. The power supply circuit further includes a primary side circuit including a primary side circuit carrier that includes a plurality of components at least a subset of which are substantially oriented in a first plane, the primary side circuit being electrically connected to the primary winding of the transformer. The power supply circuit also includes a secondary side circuit including a secondary side circuit carrier that includes a plurality of components at least a subset of which are substantially oriented in a

second plane substantially perpendicular to the first plane, the secondary side circuit being electrically connected to the secondary winding of the transformer.

As noted above, the Examiner cited Yamaguchi as teaching the subject matter of claim 1, primarily citing the schematic block diagram of a power supply unit shown in Figure 3. Generally, Yamaguchi is directed to a power supply unit having a control circuit that is operative to reduce the switching frequency of a control switch when a detection circuit detects that a load of the power supply unit is reduced, such that power consumption of the power supply unit at lighter loads is reduced. See the Abstract of Yamaguchi. That is, Yamaguchi is directed to the functional or operational characteristics of power supply units, whereas the subject matter of claim 1 is primarily directed to the physical characteristics of power supply units.

“[A] claim is anticipated [under 35 U.S.C. §102] only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” See MPEP §2131. Applicants respectfully submit that claim 1 is not anticipated by Yamaguchi because Yamaguchi does not describe, either expressly or inherently, each and every element of claim 1. As noted above, claim 1 includes “a primary side circuit including a primary side circuit carrier that includes a plurality of components at least a subset of which are substantially oriented in a first plane.” The Examiner equates the schematic block diagram of the control circuit 11 shown in Figure 3 of Yamaguchi with the “primary side circuit carrier” of claim 1. However, the dashed line that represents the control circuit 11 is not a physical structure itself, but is rather an indicator to identify the grouping of components which form a control circuit of the power supply unit 10. Conversely, the “primary side circuit carrier” of claim 1 is a physical structure (e.g., a circuit board) that is operative to support a plurality of components. Further, Yamaguchi does not show or describe “a plurality of components at least a subset of which are substantially oriented in a first plane.” In fact, the physical orientation of the components shown in Yamaguchi is not even mentioned, and only schematic block diagrams depicting representations of the components are shown. This is not surprising since, as noted above, Yamaguchi is directed to the functional characteristics of power supply units (e.g., reducing the switching frequency of a control switch for lighter loads to reduce power consumption).

Claim 1 also includes “a secondary side circuit including a secondary side circuit carrier that includes a plurality of components at least a subset of which are substantially oriented in a

second plane substantially perpendicular to the first plane.” The Examiner equates the schematic block diagram of the voltage control circuit 3 shown in Figure 3 of Yamaguchi with the “secondary side circuit carrier” of claim 1. However, as noted above with regard to the control circuit 11, the voltage control circuit 3 is not a physical structure itself, but is rather an indicator to identify which group of components forms a voltage control circuit of the power supply unit 10. Conversely, the “secondary side circuit carrier” of claim 1 is a physical structure (e.g., a circuit board) that is operative to support a plurality of components. Further, Yamaguchi does not disclose “a plurality of components at least a subset of which are substantially oriented in a second plane substantially perpendicular to the first plane.” As noted above, Yamaguchi simply does not show or describe the physical orientation of components or circuit carriers, so it follows that Yamaguchi does not disclose circuit carriers that are oriented in perpendicular planes. Further, the Examiner does not even address the second plane that is substantially perpendicular to the first plane. While the Examiner recites this language in the Final Office Action, the Examiner never addresses where this limitation can be found in Yamaguchi. The reason for this is because this limitation of claim 1 does not appear anywhere in Yamaguchi.

Accordingly, Applicants respectfully submit that Yamaguchi does not teach each and every element of claim 1. For the foregoing reasons, Applicants submit that claim 1 and its dependent claims are patentable over Yamaguchi, and that this rejection should be withdrawn.

Claim 3 is directed to a power supply circuit that includes at least one transformer that includes a primary winding connected to a primary side circuit and a secondary winding connected to a secondary side circuit. Further, components of the primary side circuit and components of the secondary side circuit are each connected to at least one separate circuit carrier, the circuit carriers being coupled with one another. Additionally, at least a subset of the components of the primary side circuit and at least a subset of the components of the secondary side circuit are arranged in at least two different planes, wherein components of the primary side circuit are connected to a plurality of primary side circuit carriers.

Applicants respectfully submit that Yamaguchi does not teach the elements of claim 3 for at least the reasons provided above with respect to claim 1. Further, claim 3 includes “wherein components of the primary side circuit are connected to a plurality of primary side circuit carriers.” As noted above with reference to claim 1, Yamaguchi does not even disclose circuit carriers, much less a plurality of primary side circuit carriers. Similarly, claim 3 includes

“components of the primary side circuit and components of the secondary side circuit are each connected to at least one separate circuit carrier.” Again, it is noted that Yamaguchi makes no reference to circuit carriers and physical orientations for circuit carriers at all. For the foregoing reasons, Applicants submit that claim 3 and its dependent claims are patentable over Yamaguchi, and that this rejection should be withdrawn.

Claim 25 is directed to a method for producing a power supply circuit that includes at least one transformer that includes a primary winding and a secondary winding, a primary side circuit, and a secondary side circuit. The method includes connecting components of the primary side circuit to at least one primary side circuit carrier, at least a subset of the components of the primary side circuit being substantially oriented in a first plane. The method also includes connecting components of the secondary side circuit to at least one separate secondary side circuit carrier, at least a subset of the components of the secondary side circuit being substantially oriented in a second plane. Further, the method includes coupling the primary side circuit with the primary winding of the transformer, and coupling the secondary side circuit with the secondary winding of the transformer, wherein the first plane is substantially perpendicular to the second plane.

As noted above, the Examiner rejected claim 25 under 35 U.S.C. §102(b) as being anticipated by Sato. Applicants respectfully submit that Sato does not teach each and every element of claim 25. Specifically, Sato does not teach “wherein the first plane is substantially perpendicular to the second plane.” Rather, Sato shows and describes a primary circuit carrier 1 and a secondary side circuit carrier 2 disposed in a parallel relationship. (See Figures 1A and 1B and column 3, lines 29-36 of Sato, which show and describe the parallel physical orientation of the circuit carriers 1, 2 relative to each other). In the Final Office Action, the Examiner completely omitted any discussion regarding this element. Therefore, since Sato does not teach each and every claim element of claim 25, Applicants submit that claim 25 is patentable over Sato, and that this rejection should be withdrawn.

Claim 26 is directed to a method for producing a power supply circuit that includes at least one transformer that includes a primary winding and a secondary winding, a primary side circuit, and a secondary side circuit. The method includes connecting components of the primary side circuit to at least one primary side circuit carrier, at least a subset of the components of the primary side circuit being substantially oriented in a first plane. The method also includes

connecting components of the secondary side circuit to at least one separate secondary side circuit carrier, at least a subset of the components of the secondary side circuit being substantially oriented in a second plane. Further, the method includes coupling the primary side circuit with the primary winding of the transformer, and coupling the secondary side circuit with the secondary winding of the transformer, wherein the first plane is substantially perpendicular to the second plane, and wherein components of the primary side circuit are connected to a plurality of primary side circuit carriers.

Applicants respectfully submit that Sato does not teach the elements of claim 26 for at least the reasons provided above with respect to claim 25. Further, claim 26 includes “components of the primary side circuit are connected to a plurality of primary side circuit carriers.” Applicants respectfully assert that Sato does not teach this element of claim 26. The Examiner cited element 4 shown in Figures 3A and 3B and column 3, lines 37-45 of Sato as disclosing this element of claim 26. However, element 4 is a resin material and the cited section of Sato describes the dissipation of heat produced by the circuit boards through the resin material 4. It is unclear to the Applicants how the resin material 4 could be equated to the “plurality of primary side circuit carriers” of claim 26. Therefore, since Sato does not teach each and every claim element of claim 26, Applicants submit that claim 26 and its dependent claims are patentable over Sato, and that this rejection should be withdrawn.

Based upon the foregoing, Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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Date: August 10, 2009